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ABSTRACT

Job-related measures of the educational effectiveness of an institution are critiqued. Three criteria of job-related measures are: the measure's ability to discriminate between the performance that can be attributed to the program being studied compared to what might have happened if there were no program, and whether the measure is economic. Empirical material from a followup of graduates from Southern Maine and Northern Maine Vocational Technical Institutes is presented for illustration. One technique for judging the effectiveness of a school is to ascertain how many of its graduates get jobs. A second measure of a school's effectiveness is whether most of its graduates are "using" their education. A third approach to a school's effectiveness is the internal rate of return, which treats education as an investment and evaluates the investment by comparing benefits with costs. Objections to rate of return studies are discussed. Another measure of educational effectiveness, the income cost ratio, is described in an appendix. (SW)

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JOB RELATED MEASURES OF EDUCATIONAL EFFECTIVENESS

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INTRODUCTION

In this era of accountability educational institutions are often called upon to justify their programs, if not their existence. Many times this justification revolves around the work that graduates enter after leaving school. This article is a description and critique of three job related measures of educational effectiveness. The critique is based on three criteria. One is the measure's ability to identify what an educational program is accomplishing in terms of its labor market objectives. A second is the measure's ability to discriminate between the performance that can be attributed to the program being studied compared to what might have happened had there been no educational program. The third is whether the measure is economic, that is, does it accurately indicate how efficiently the results are obtained?

Empirical material from a follow-up of graduates from Southern Maine (SMVTI) and Northern Maine (NMVTI) Vocational Technical Institutes is presented for illustration. (Clark, 1977).

The measures of effectiveness in this article are tools of evaluative research but they do not constitute a complete evaluation of an educational institution. There are many worthwhile objectives of education only some of

which have anything to do with labor market activity; also there are important components of a complete evaluation which are not covered at all in this article (Suchman, 1967). Job related measures of effectiveness are particularly appropriate for technical schools since the education is so often supposed to be directly connected with labor market requirements.

PLACEMENT RATES

One technique for judging the effectiveness of a school is to ascertain how many of its graduates get jobs; a school is successful if a large proportion of its graduates are working after leaving school. The objective against which this measurement judges success is that the school is there to help its graduates get paid employment. The main problem here is that the objective is much too modest. In any economy with a reasonably high level of aggregate demand most persons will eventually be absorbed into the economy. If one asks about the performance of a school compared with what would have happened anyway, there is very likely to be no discernible effect even for a school that does an excellent job in preparing its students for the world of work.

For example, both two year technical schools referred to earlier had very high and virtually identical placement rates for their graduates (see Figure 1) although, as will be shown below, one school was apparently doing a much better job than the other in preparing its graduates for the labor market. It is not the fact of a job placement that is important but the quality of that job.

Figure 1

Job Related Measures of Educational Effectiveness
for Two Post-secondary Technical Schools

	Schools	
	SMVTI	NMVTI
A. Placement Rates (1)	93%	90%
B. Work Relatedness Test		
A. Proportion in job for which he was trained, according to school	67%	68%
B. Proportion in job for which he was trained, according to graduate	44%	42%
C. Internal Rate of Return	12%	2%

(1) Placement Rate: Proportion of 1975 graduates in the labor force who were working nine months after graduation.

Source: Clark, 1977.

WORK-RELATEDNESS TEST

The second measure to be covered is the work relatedness test. A school is judged to be effective if most of its graduates are "using" their education; the school is doing a poor job if graduates are working in occupations that do not use or are not related to their education. This approach has a great deal of intuitive appeal, particularly for occupationally oriented education, such as the technical schools used for illustrative purposes. At first glance the measure would seem to add an important dimension to the raw placement rates described above.

There would seem to be two objectives against which performance is being measured when a work relatedness test is applied. One, as above, is to help students into paid employment but with a somewhat more sophisticated test of performance than the simple placement test; if the individual is not using his education in his job the implication is that he probably could have had the job without the education. The second objective against which performance is being measured is that education should add to the stock of human capital in the economy. The test of whether education really produces human capital or not is whether that capital is being used in paid employment.

All this seems reasonable enough. However, the measure has severe practical and conceptual problems.[1]

On the practical side: which occupations are education related? It is very difficult to maintain a list of occupations appropriate to a

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[1]The work relatedness test is similar in approach to a very popular, and much criticized, educational planning technique, the manpower requirements approach. The manpower requirements approach attempts to set education goals on the basis of the future manpower needs of the economy (Parnes, 1964). The OECD pioneered its use and also commissioned one of its most comprehensive critiques (Hollister, 1966). I have drawn heavily on the critisms of the manpower requirements approach in developing my critique of the work relatedness test.

particular education program since the list of actual occupations and the nature of occupations on that list change very rapidly, perhaps more rapidly than anyone can keep track of. There is a similar issue. Education supposedly transmits a very substantial vector of knowledge, work skills, attitudes, ability, background for independently solving problems, etc. How many of these or what part of these "characteristics" does a student have to be using before he or she is considered to be in an education related job?

Figure I contains two approaches toward finding out whether graduates were using their education. First, each respondent was asked for his current occupation and school officials compared his answer with the student's speciality in school. Second, each graduate was asked directly whether or not his job was closely related to his education. The results were quite different for the questions, but not for the schools. The data illustrate two difficulties of applying the work relatedness test: one, the results depend on who is asked the question. Two, in this case at least, the test did not discriminate between schools; the benefit measures were the same even though, as explained below, there were substantial differences between the two schools.

Even more important than the practical problem is that the work-relatedness test contains a basic conceptual flaw. It contains no notion of cost. It is solely a benefit measure without any consideration of the resource cost of those benefits. Just because graduates are in an education related occupation is no test that they could not have been in that job anyway, perhaps through some alternative combination of work, training and education and with less (or more) cost involved. Or, to look at the issue from another perspective, just because graduates are in jobs that use their education does not necessarily mean that those education resources are being used in the most efficient manner. There may be alternative uses that would provide even

greater benefits from those resources.

Education is not free, indeed it is often very expensive. Any good measure of educational effectiveness must include cost in its calculations.

RATE OF RETURN

The general approach of the internal rate of return is to treat education as an investment and to evaluate this investment by comparing benefits with costs. (Based on the work of Becker, 1964, Blaug, 1965, and many others.) The benefits are the incremental lifetime income after graduation associated with the additional education that one is evaluating. The costs are the extra costs of that education including foregone earnings as well as direct costs. The internal rate of return is that discount rate that equates the present value of the benefits to the present value of the costs. By comparing the rate of return from other schools or from other forms of social investment one may judge if a particular school has been a good investment. If there are alternatives that yield higher returns, then resources that have been going into the particular school could have been used elsewhere with better effect. The data in Figure 1 show that SMVTI is a better investment than the other school. Just how good an investment? If one takes 10% (the commonly accepted social discount rate in the United States) as the return on alternative investments, then SMVTI has been a good investment, the other school a poor one.

The objective against which one is judging the performance of a particular school is that of an increase in income. From a national viewpoint it would be a rise in national income; for the individual, a rise in after-tax income. The theoretical basis is that education enhances productivity and the rise in productivity is measured by the change in income

associated with the education.

The measure combines estimates of performance and efficiency by explicitly comparing benefits with costs and therefore the measure would appear to answer most of the problems raised above in the discussion of the other job effectiveness measures.

The technique does have some shortcomings of both an operational and conceptual nature. A basic premise is the validity of the marginal productivity theory, which implies that productivity differences among educational levels are reflected in observed differentials in earnings. Critics have argued that many wages are set by custom or administrative decision, not by market forces and hence do not reflect factor scarcities. This may occur but if wage rates were administered prices, not market prices, then disequilibrium would occur and the market would not clear. In the study of technical schools illustrated in Figure I all persons were hired at measured wage rates (that is, the market cleared); therefore, one can conclude that the wage rates were indeed market rates.

A second major objection levelled against rate of return studies is that not all differences in earnings associated with education can be attributed to education but are a result of differences in ability, family background, motivation, training, etc. As a practical matter these factors can and should be taken into account, and also should be remembered when the results are interpreted. The study of technical schools included a control group of individuals who had the qualifications to enter the technical school but chose to enter the labor market instead.

A third objection is that rate of return studies do not differentiate between internal and external efficiency. Internal efficiency refers to how well a school 'produces' persons with a particular form of training or

qualifications. A school is internally efficient if can be shown to be a low cost producer of those skills or qualification that it is trying to teach its students. External efficiency refers to whether those skills or qualifications are highly valued in relevant labor markets. (Zymelman, 1976)[2] The high rate of return for SMVTI probably means that the school is efficient both internally and externally: SMVTI is probably an efficient producer of skills and qualifications that are highly valued in the labor market. On the other hand, the low rate for NMVTI may mean that the school is a high cost producer or it could mean that the school is teaching skills that are not valued very highly. A low rate of return is a trouble signal but, by itself, does not necessarily identify the source of the trouble.

Operational and conceptual problems about the data needed to calculate rates of return represent a fourth area of objections. The benefits to the education are the increase in lifetime earnings. However, one cannot wait a lifetime for the data to make rate of return calculations. Therefore one uses cross sectional data to simulate lifetime earnings. One issue is that older age groups may have had a very different quality of education and been subjected to very different criteria for choosing who shall go on to further education. This criticism is particularly important for a newly independent country or one that is changing very rapidly. Another issue is

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[2]An example of the efficiency issues is found in a recent study by Borus (1977) of alternative types of training institutions in Israel. Since the earnings of men of the same age groups who had completed various forms of training were very similar he concluded that the different modes of training yielded approximately equal products (same external efficiency). However costs of the various modes varied considerably, somewhat on the order of 1:5:9 when comparing the costs of apprenticeships to the costs of short courses and industrial schools to the costs of formal vocational secondary schools. For the skills and training groups studied apprenticeships had the highest level of internal efficiency and formal vocational schools the lowest.

that relative wage rates for persons who are already in the labor force may be slow to change and only entry jobs reflect current market conditions. A third issue is how information about earnings is to be collected. Census materials can be used to measure the rate of return for broad educational categories but not for individual schools or programs. For the latter one must resort to surveys which not only can be costly but also graduates who have been out of school for some time are hard to find. The rates of return in Figure I are based on data from graduates for the last five years whose earnings were projected to estimate incremental lifetime income. One redeeming fact about earnings data is that with high discount rates it is the early years after graduation that have the largest relative impact and the data for these years are probably the most accurate, easiest to get, and should bear the closest resemblance to current market conditions. (See appendix for a substitute technique that side steps some of the data problems.)

There are also problems in estimating costs. The estimation of foregone earnings has the same problems as encountered in measuring the benefits of education. The major problem with recurrent costs is that it may be difficult to separate out education from all the other functions of a school. Finally, there is no accepted method in the economics literature of estimating the capital cost of education. All these certainly apply if one is trying to evaluate individual programs in that school.

SOME CONCLUSIONS

Two important objectives of most educational institutions are to prepare students for work and to supply the human capital needs of the economy. This paper has described and analyzed methods of measuring how effectively

and efficiently an institution is meeting these objectives. If one had to choose probably the best test is the internal rate of return since it shows how much the additional education is worth, in the sense of what extra it will earn on the open market as compared with what it costs.

But perhaps a choice should not be made. Both the work-relatedness test and the rate of return have their faults. Both measures ignore non-job related benefits of education. The work-relatedness test has an imperfect measure of market performance and leaves out any consideration of costs. The rate of return relies on fairly heroic assumptions about the competitiveness of labor markets and, at times, on a very uncertain data base. Each of these measures has some advantages, and, if one is aware of the possible shortcomings in the conceptual framework and the data, each measure probably has something to add to our knowledge about the labor market effectiveness of an educational institution. The rate of return is easy to criticize but the technique does explicitly include costs in its calculations of efficiency; one cannot honestly measure efficiency by measuring benefits alone. Work relatedness cannot stand by itself but it can help in understanding the relationships between school and the labor market. In short, then, this article is a brief description and analysis of complementary, not competing, forms of evaluating educational effectiveness.

APPENDIX

INCOME COST RATIOS

I have experimented with another job related measure of educational effectiveness which I call an income cost ratio. It is similar to the internal rate of return but with somewhat more modest objectives. It is calculated by dividing the extra annual income associated with additional education by the

extra cost of the education. The ratio is an indication of the relationship between benefits and costs. The extra cost is the same as used in rate of return analysis: direct educational costs plus earnings foregone while in school. The benefits used in the calculation are of course incomplete since only one year's incremental earnings are used. From a technical point of view one is comparing single points on the age-earnings profiles of those with various amounts and types of education. Income cost ratios are used to rank the various educational institutions being studied. Since the benefit measure is incomplete one cannot say, as one can with rate of return, whether either school is a good or bad investment; the income cost ratios only indicate which school or schools are the better investments.

Among the advantages of the income cost ratio is that it uses current market results as the indication of the benefits or costs of the education being studied, a measure that takes into account current labor market demand and supply conditions. There is no attempt to estimate lifetime earnings so the technique avoids the numerous assumptions needed for that exercise. The ratios would appear to be particularly useful for judging the effectiveness of schools were rapid change is occurring in either the educational system or in the economy.

As an illustration Figure 2 contains income cost ratios for five schools in Singapore. The ratios were used to evaluate important changes that the Singapore government was making in its school system where the issue was not whether education was a good investment but what types of education was best meeting the needs of the rapidly changing economy. Post-secondary education - both academic and technical - was the best investment among the schools in the study. The low standing of university education was

not caused by any difficulty of graduates to get good jobs. Generally university graduates did well in the labor market and earned substantially more than those without the extra education but the difference was not enough to overcome the high costs of university education. If these data were calculated on a fairly regular basis they should be an economical way of ascertaining market changes and current trends.

FIGURE 2

Income Cost Ratios and Rankings as Social Investment, Selected Schools in Singapore, 1970

School	Income/Cost Ratios (1) (%)	Ranking as Social Investment
Secondary		
Academic-Secondary 4	27	third (tie)
Technical Secondary School	28	Third (tie)
Vocational Institute	29	third (tie)
Post-Secondary		
Pre-University	46	first
Polytechnic	42	second
University	16	sixth

(1) Incremental yearly earnings as percent of incremental cost.

Source: Clark, 1972.

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